Installation and User Manual for AppCluster™

Release 2.0

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System Requirements

- Pentium IV class processor or equivalent
- 256 MB RAM
- 12 MB free disk space for installation
- Sanbolic® Melio™ shared storage
- LAN (TCP/IP) connectivity
- SVGA – min. 800x600, 256 colors
- .Net Framework v3.5
- Microsoft® SQL Server™ 2005, 2008, 2008 R2 or SQL Server Express™
- SQL Management Objects (SMO)

Supported Operating Systems

- Windows Server 2003™ x64
- Windows Server 2003™ R2 x64
- Windows Server 2008™ x86, x64
- Windows Server 2008™ R2 x64

Note: *Windows Server 2003™ (x86) and Windows Server 2003™ R2 (x86) are not supported.*

About AppCluster™

AppCluster™ is a component of Sanbolic's **Melio**™ distributed data management software suite that enables active-active clustering of SQL Servers using shared storage (local (DAS) or external (SAN)) provided by Sanbolic's advanced, 64-bit, symmetrical cluster file system, ***Melio FS***™. Clustering SQL Servers around a shared file system allows databases to be stored on a single volume, simplifying database management and optimizing storage utilization while enabling database high availability and intelligent load-balancing during SQL Server failures.

Using AppCluster, databases, which are organized into units called "Resource Groups", can be moved (automatically) between SQL Servers (physical or virtual) rapidly to minimize disruptions in database accessibility. As an added benefit achieved with the use of Melio shared storage, AppCluster also has the ability to help maintain optimal performance levels during SQL Server failures by allowing administrators to assign weightings to servers and databases.

When configured, server and database weightings are used by AppCluster to determine the most effective way to distribute (fail over) Resource Groups (databases) across all active SQL Servers in a SQL Server cluster. AppCluster interprets servers with higher weightings to mean they can support larger workloads while databases with higher weightings are interpreted to mean they have the potential to impose larger workloads, such as a credit card transaction database. This feature can prove extremely effective for sustaining necessary performance levels for business- and/or mission-critical databases, particularly in mid- to larger-size SQL Server deployments (i.e., many servers and many databases).

Providing a simple, cost-effective HA solution for SQL Server, AppCluster works with all industry-standard server and storage hardware and can run inside virtual machines hosted by popular hypervisors, including Microsoft® Hyper-V™, VMware® vSphere™ and Citrix® XenServer™.

Preparing databases for AppCluster

If a new SQL database is going to be created, both the database file and associated log file must be detached from their default location and moved to Melio shared storage that is accessible to all the SQL Servers that will be participating in the SQL Server cluster. After the database and log files have been moved, they can be reattached by browsing for the files in their new locations on Melio shared storage.

For a SQL database that already exists, all connections to the database from SQL Clients must be closed and the database file and associated log file detached from their current location and moved to Melio shared storage that is accessible to all the SQL Servers that will be participating in the SQL Server cluster. After the database and log files have been moved, they can be reattached by browsing for the files in their new locations on Melio shared storage.

Note: *Per Microsoft® best practices for SQL Server, Sanbolic recommends storing all log files on a separate Melio shared volume than the one used to store database files.*

Once the database and log files reside on Melio shared storage, AppCluster can be launched and a new SQL Server cluster can be created.

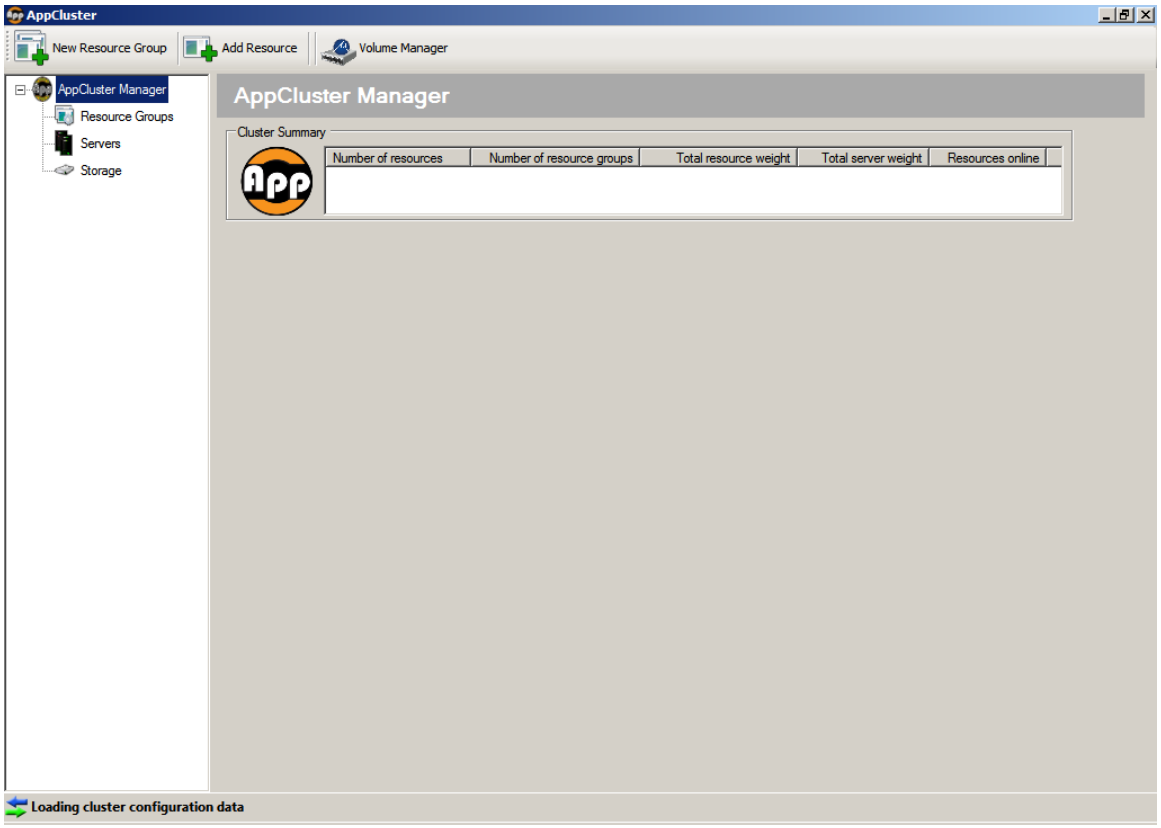
Using Melio™ shared storage with AppCluster

AppCluster requires Melio shared storage be used to store SQL databases and log files, preferably on separate shared volumes.

To create shared volumes with Melio, refer to the Sanbolic Melio User's guide, which is located in the installation directory of the Melio software (*C:\Program Files\Sanbolic\Melio* - default). User guides are also available for download at http://www.sanbolic.com/support.htm.

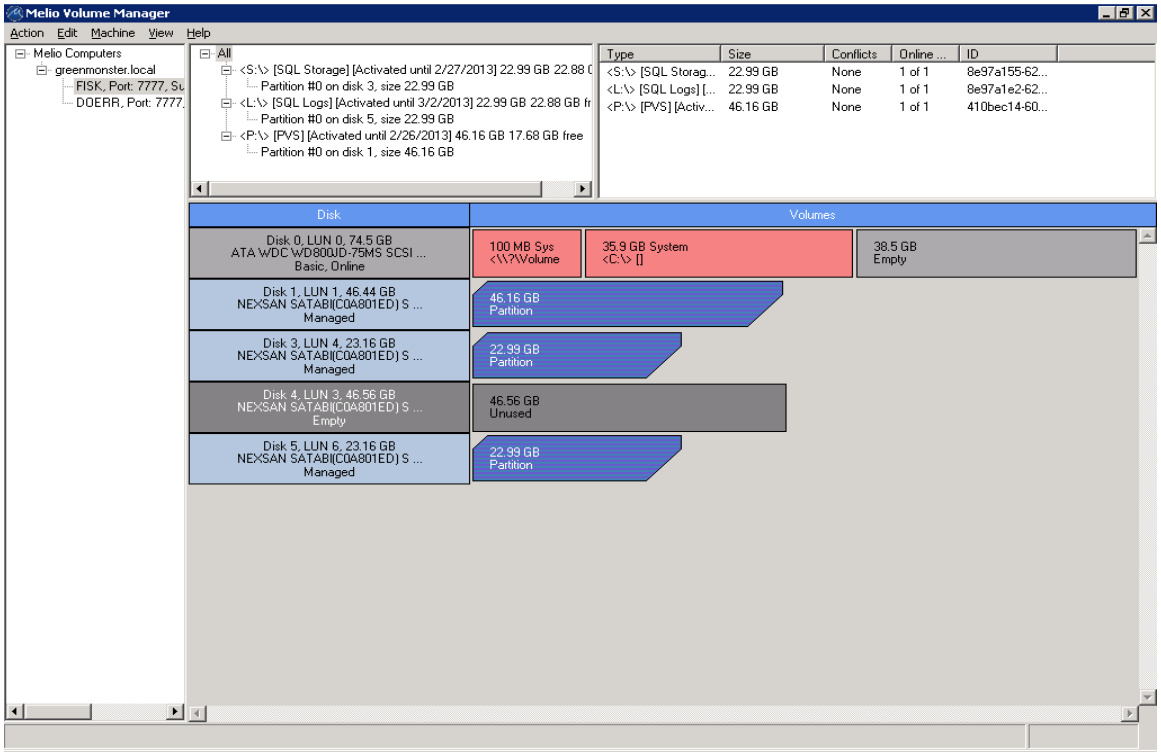
Melio shared volumes are created and managed using Melio Volume Manager, which is included with the Melio software.

Melio Volume Manager can be launched from the Start menu (*Start > All Programs > Sanbolic > Melio Volume Manager*) or directly from AppCluster, by clicking **Volume Manager** in the toolbar at the top of the AppCluster management console.

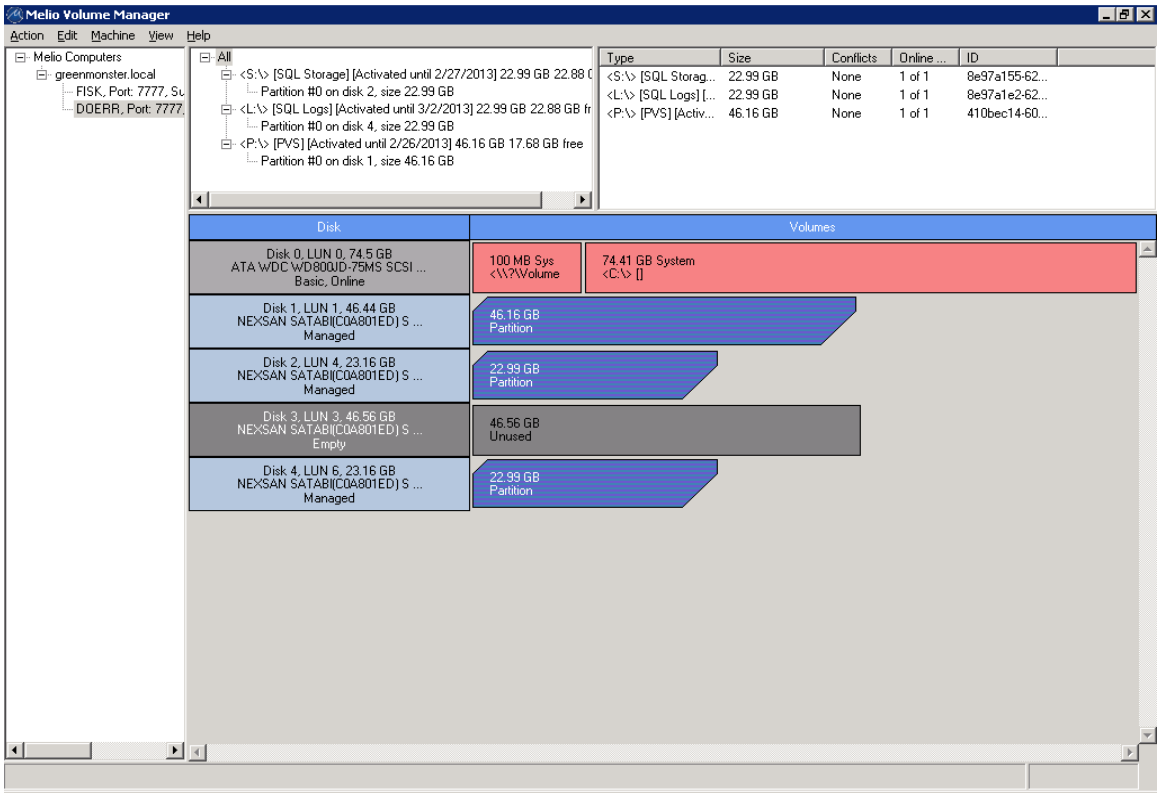


The diagrams on the following pages show two Melio shared volumes (S: drive – contains AppCluster configuration files and SQL databases, and L: drive – contains SQL log files) accessible by two SQL Servers – "Fisk" and "Doerr". These shared volumes ***must*** be created ***prior*** to configuring AppCluster for initial use (first run).

Melio Volume Manager console on server “Fisk”:

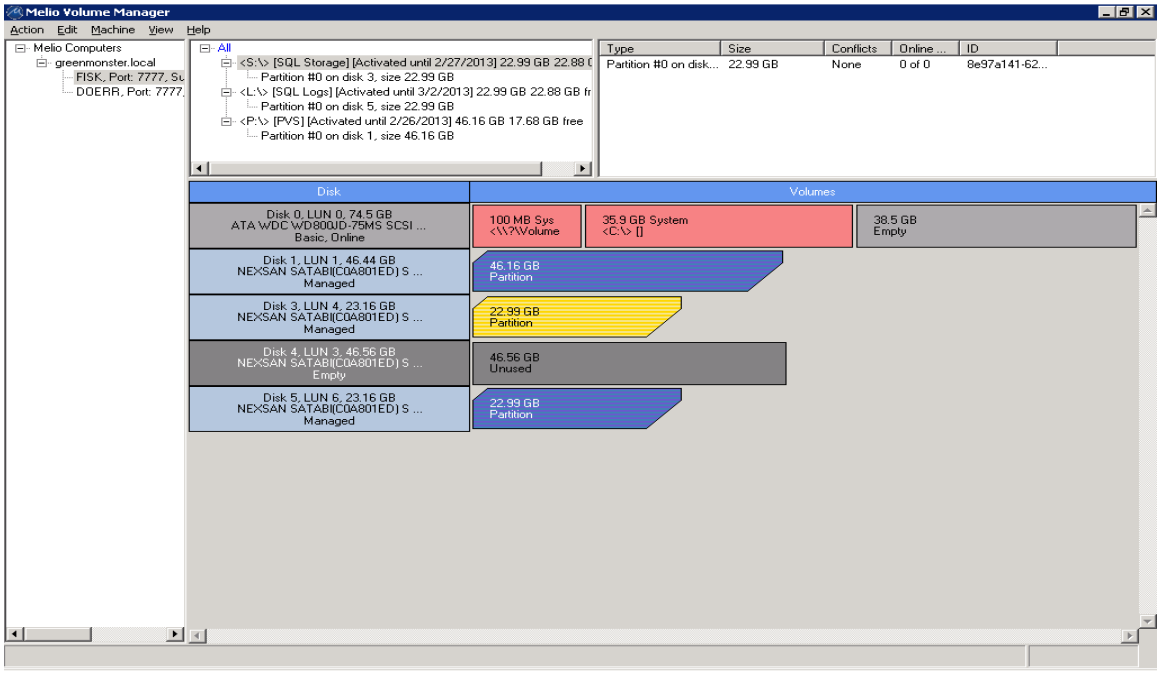


Melio Volume Manager console on server “Doerr”:

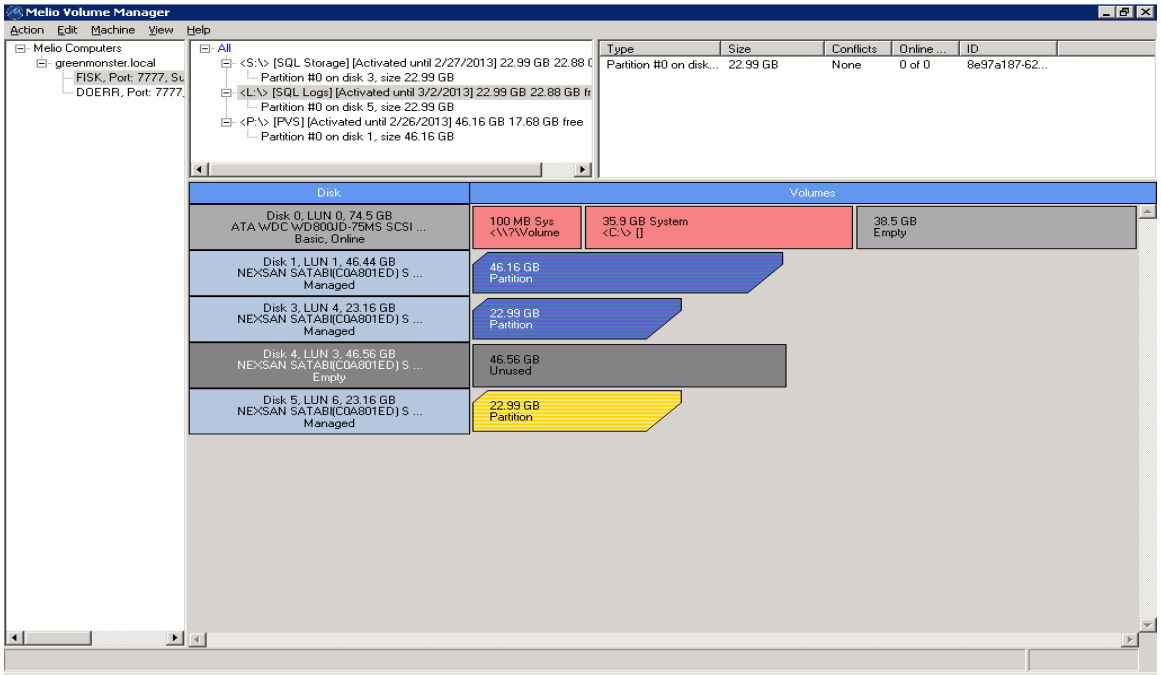

Melio Volume Manager
Action Edit Machine View Help
Melio Computers
greenmonster.local
FISK, Port: 7777, Su
DOERR, Port: 7777,
All
<S:\> [SQL Storage] [Activated until 2/27/2013] 22.99 GB 22.88 G
Partition #0 on disk 2, size 22.99 GB
<L:\> [SQL Logs] [Activated until 3/2/2013] 22.99 GB 22.88 GB fr
Partition #0 on disk 4, size 22.99 GB
<P:\> [PVS] [Activated until 2/26/2013] 46.16 GB 17.68 GB free
Partition #0 on disk 1, size 46.16 GB
Type Size Conflicts Online ... ID
<S:\> [SQL Storag... 22.99 GB None 1 of 1 8e97a155-62...
<L:\> [SQL Logs] [... 22.99 GB None 1 of 1 8e97a1e2-62...
<P:\> [PVS] [Activ... 46.16 GB None 1 of 1 410bec14-60...
Disk
Volumes
Disk 0, LUN 0, 74.5 GB
ATA WDC WD800JD-75MS SCSI ...
Basic, Online
100 MB Sys
<\\?\Volume
74.41 GB System
<C:\> []
Disk 1, LUN 1, 46.44 GB
NEXSAN SATABI(C0A801ED) S ...
Managed
46.16 GB
Partition
Disk 2, LUN 4, 23.16 GB
NEXSAN SATABI(C0A801ED) S ...
Managed
22.99 GB
Partition
Disk 3, LUN 3, 46.56 GB
NEXSAN SATABI(C0A801ED) S ...
Empty
46.56 GB
Unused
Disk 4, LUN 6, 23.16 GB
NEXSAN SATABI(C0A801ED) S ...
Managed
22.99 GB
Partition

In this example, in order to configure AppCluster for initial use (first run), both servers (Fisk and Doerr) must be able to access (read and write) the S: drive, which will be used to store the AppCluster configuration files and SQL databases, and the L: drive, which will be used to store the SQL log files.

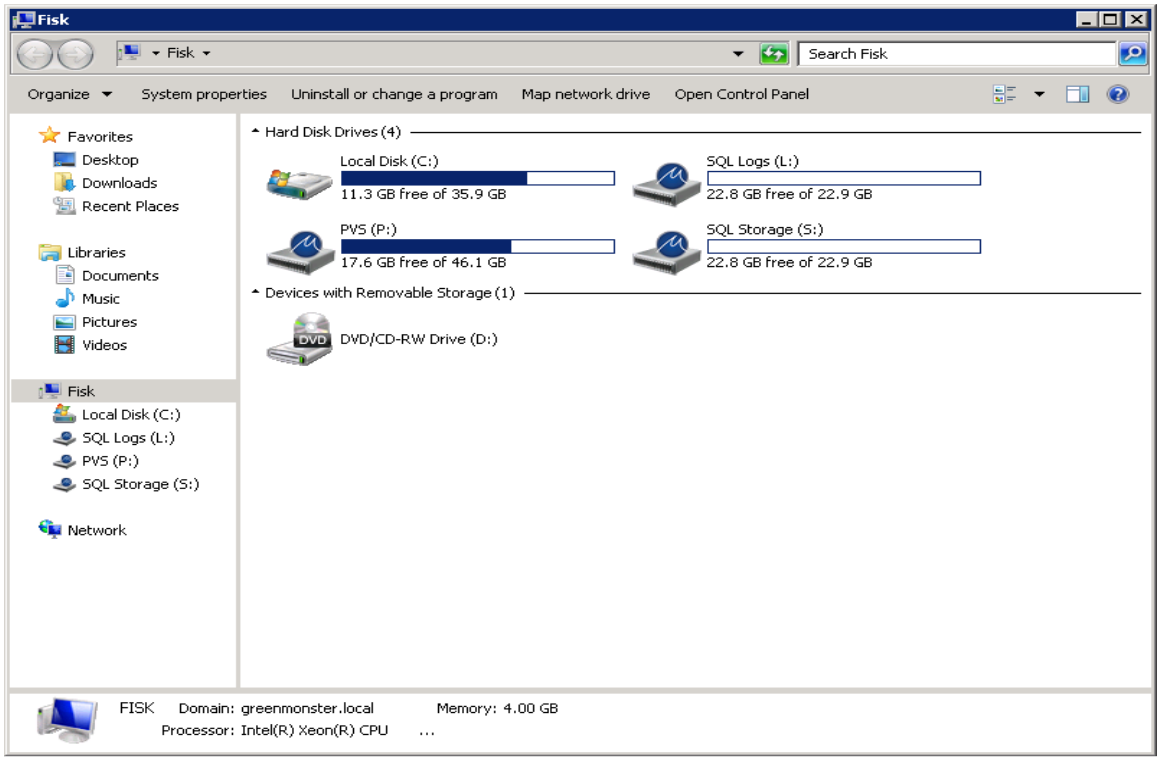
Note the S: drive in the following diagram:



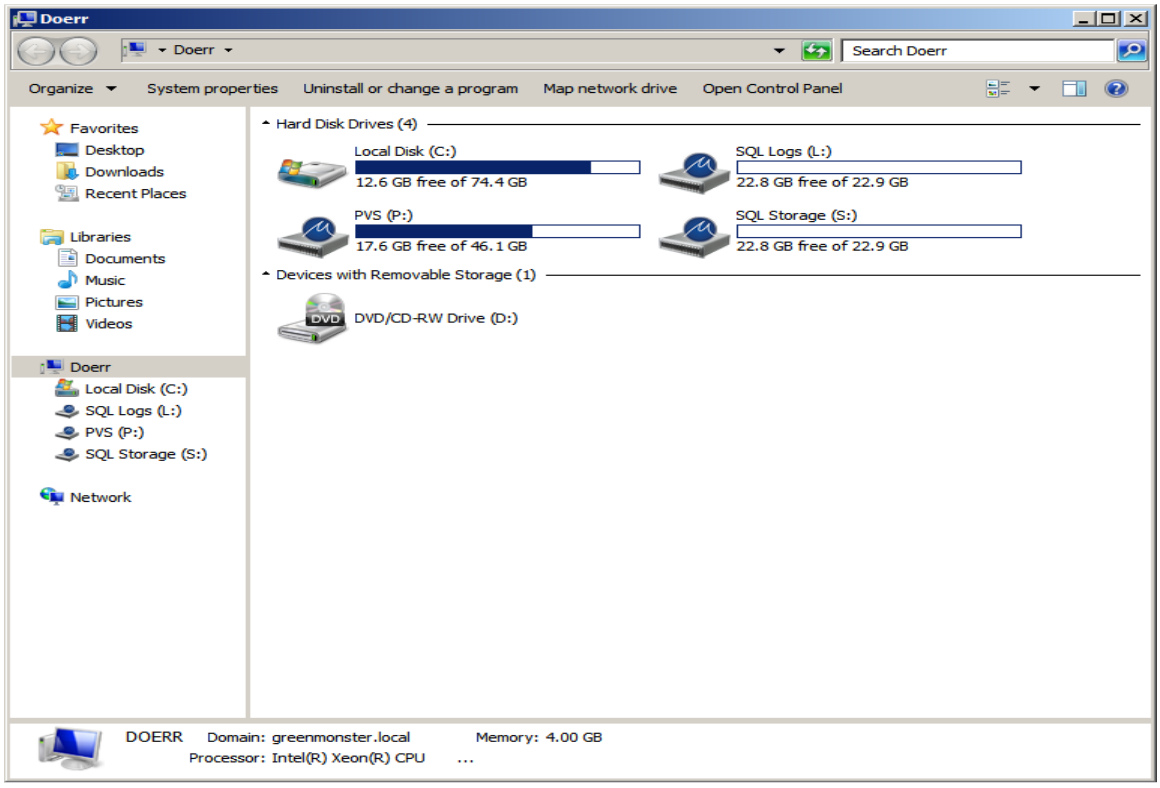
Note the L: drive in the following diagram:



My Computer on server “Fisk”:



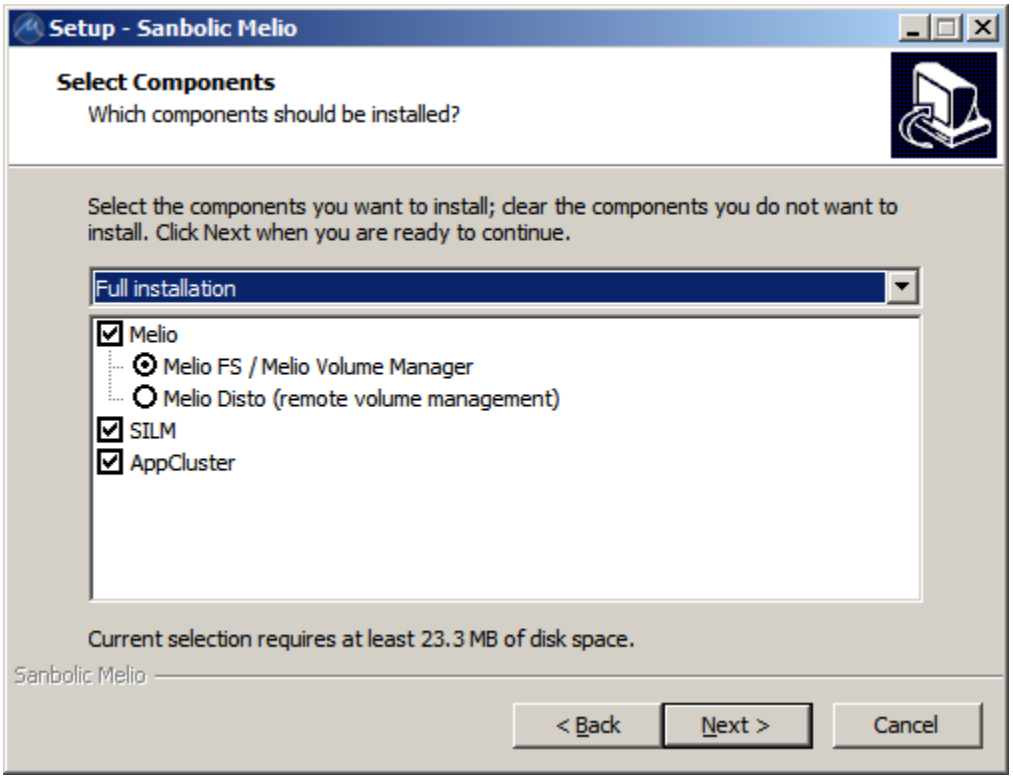
My Computer on server “Doerr”:



Installing AppCluster

During the installation of Melio, if the user selects “Full Installation” (default) in the **Select Components** window, AppCluster will be installed automatically with no additional prompting necessary. If AppCluster is removed from the list of selected components, it will not be installed.

Follow the instructions to complete the installation of the Melio software.

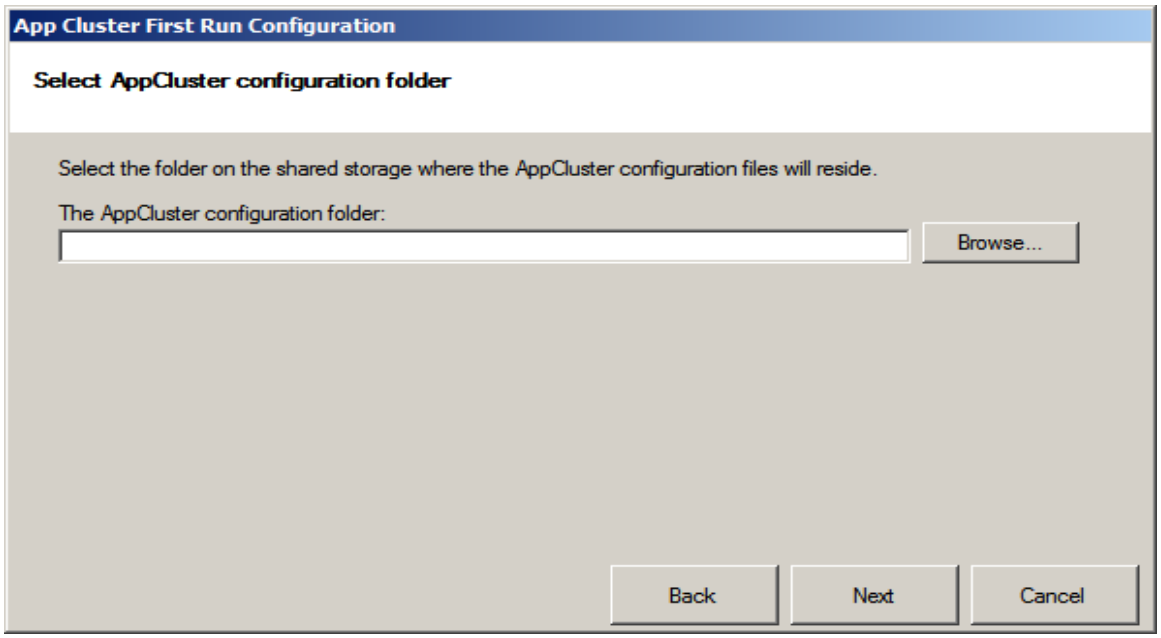

Setup - Sanbolic Melio
Select Components
Which components should be installed?
Select the components you want to install; clear the components you do not want to install. Click Next when you are ready to continue.
Full installation
Melio
Melio FS / Melio Volume Manager
Melio Disto (remote volume management)
SILM
AppCluster
Current selection requires at least 23.3 MB of disk space.
Sanbolic Melio
< Back
Next >
Cancel

Configuring AppCluster for initial use (first run)

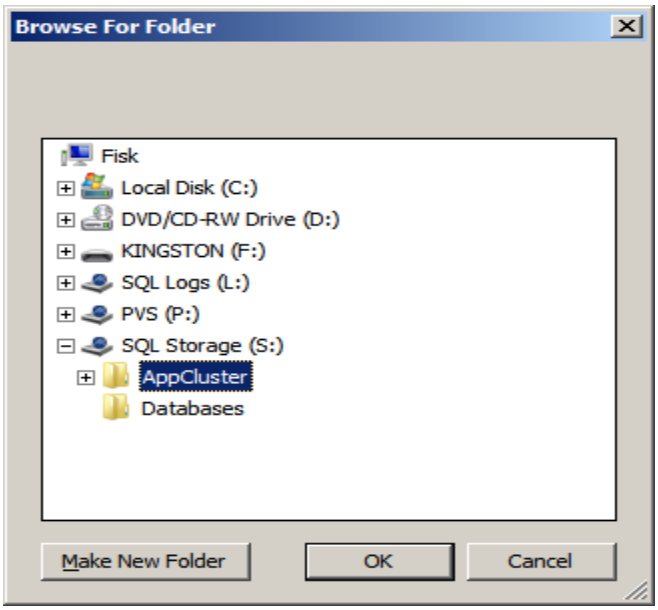
Before using AppCluster, an administrator ***must*** perform the initial configuration of AppCluster on ***each*** SQL Server that will be participating in the SQL Server cluster.

To perform the the initial configuration of AppCluster, go to *Start > All Programs > Sanbolic > AppCluster* and follow the instructions below.

Select the configuration folder for AppCluster:

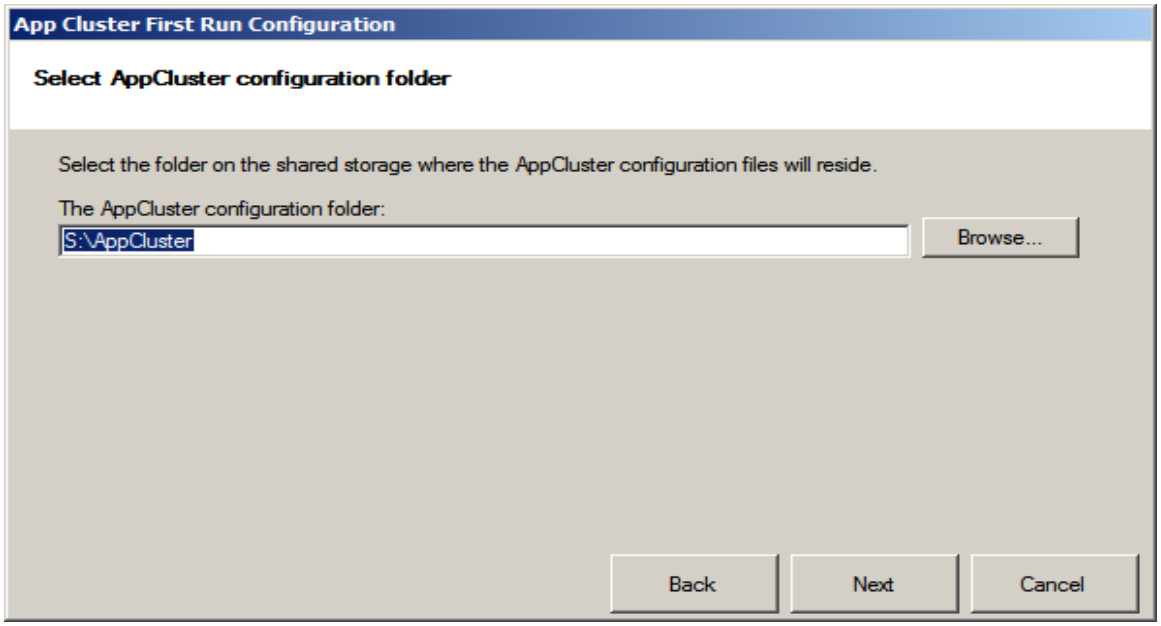


Click “Browse” to locate the folder that will contain the AppCluster configuration files.



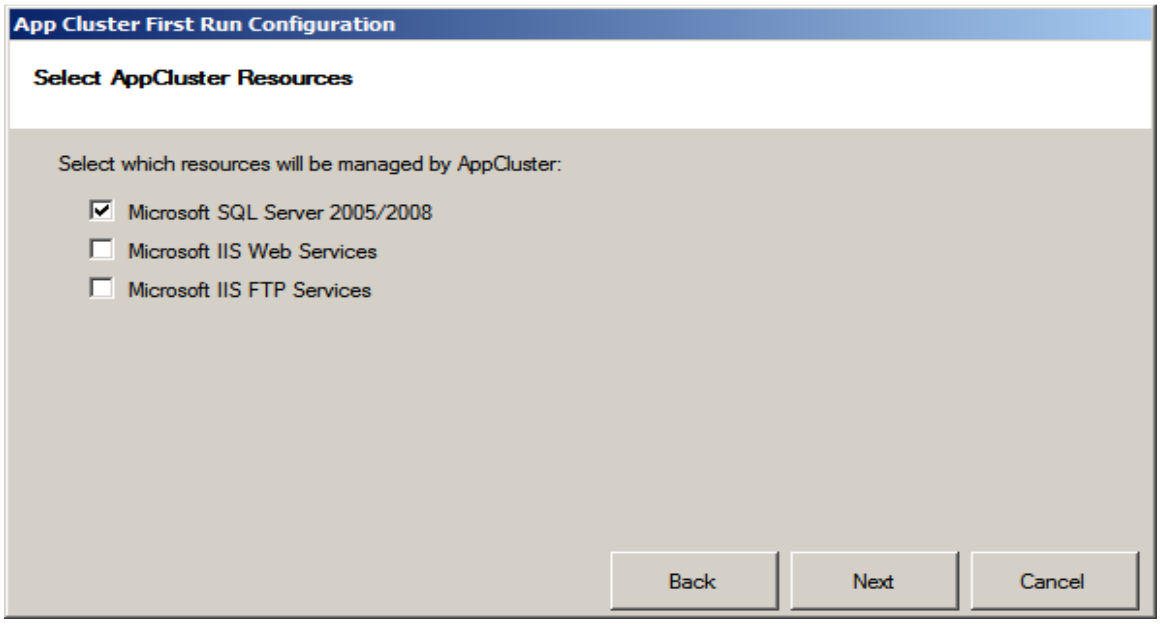
Note: *The folder that will contain the AppCluster configuration files* ***must*** *reside on a Melio shared volume. This is a requirement for creating a SQL Server cluster using AppCluster. For information on creating a Melio shared volume, refer to the Sanbolic Melio User's guide.*

Select or create a new folder and click "OK".



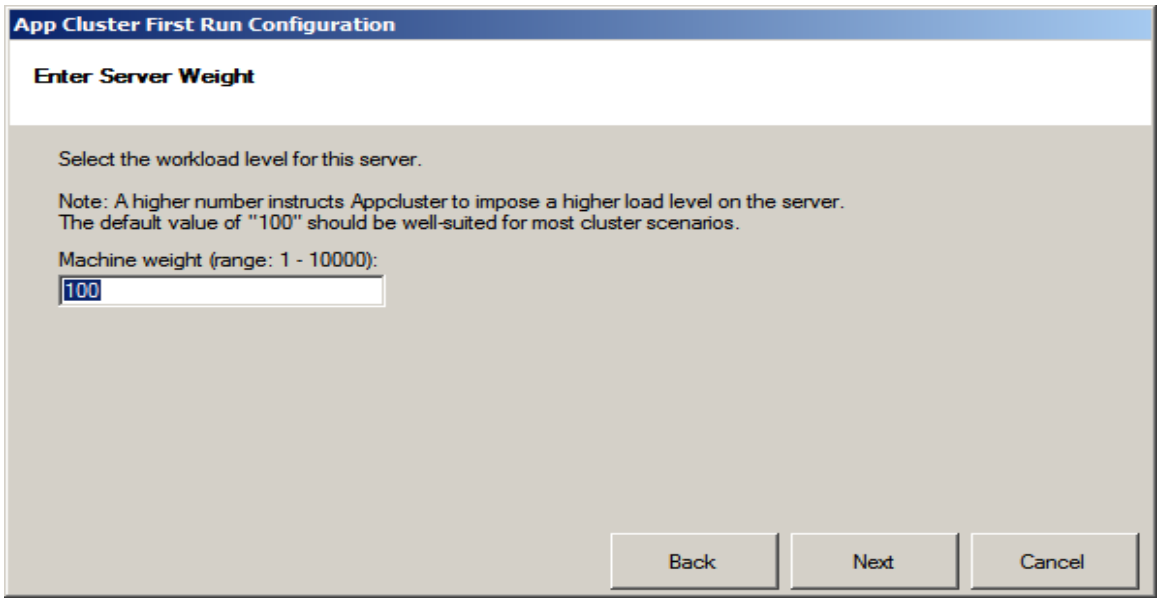
Click "Next" to continue.

Select "Microsoft SQL Server 2005/2008" as the resource that will be managed by AppCluster:



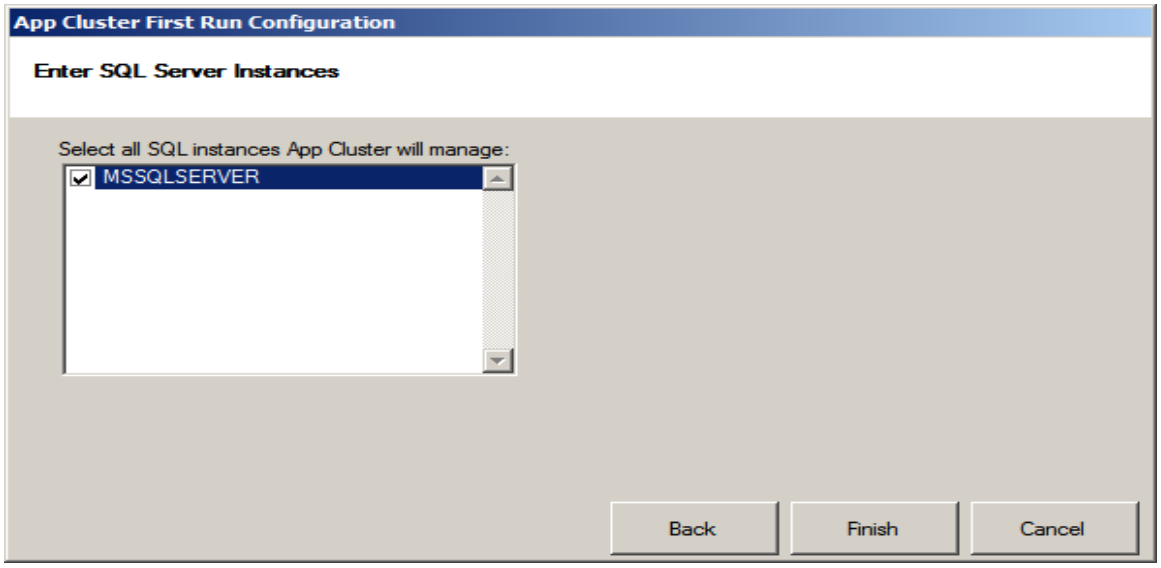
Click "Next" to continue.

Enter a weight for the server:

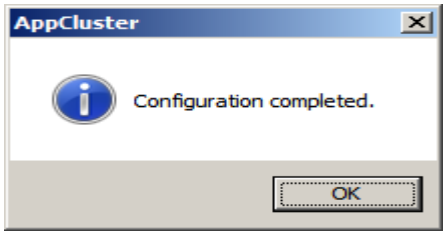

App Cluster First Run Configuration
Enter Server Weight
Select the workload level for this server.
Note: A higher number instructs Appcluster to impose a higher load level on the server.
The default value of "100" should be well-suited for most cluster scenarios.
Machine weight (range: 1 - 10000):
100
Back
Next
Cancel

Click “Next” to continue.

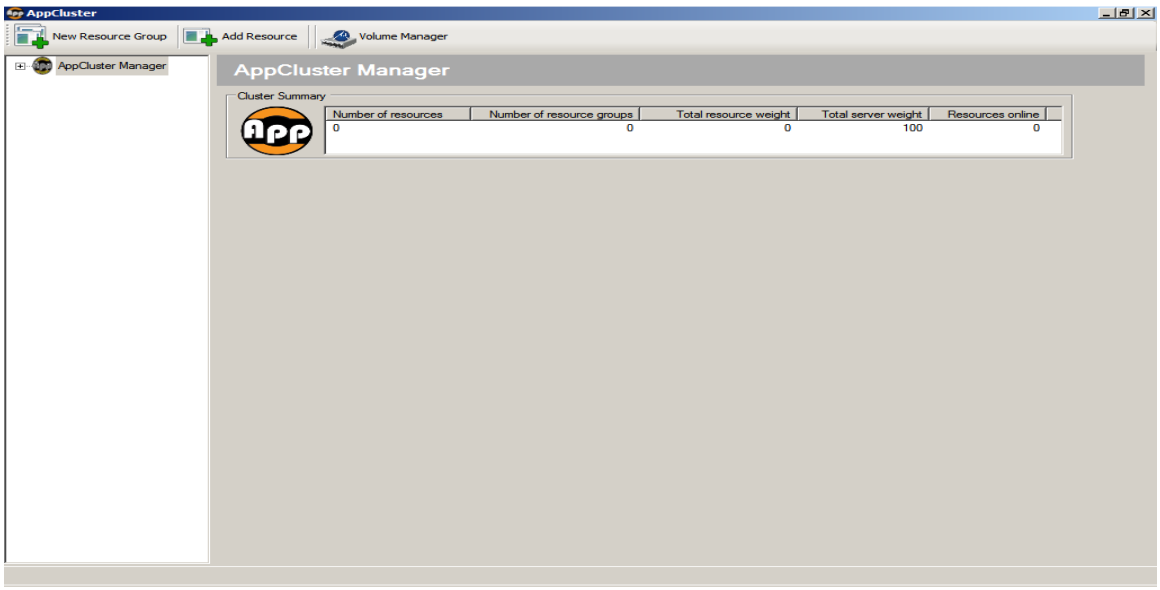
Enter the SQL Instance(s) that will be managed by AppCluster:



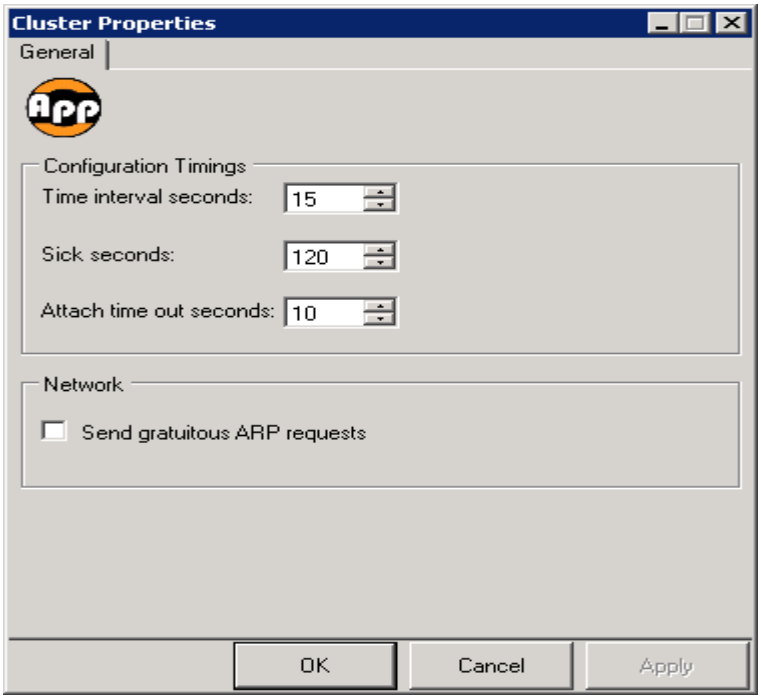
Click “Finish” to complete the initial configuration of AppCluster.



Once the initial configuration of AppCluster is completed, the AppCluster management console will be displayed:



Right-click on the AppCluster Manager tree and select “Properties”.



In the **Cluster Properties** configuration window, note the following parameters:

Time interval seconds: The number of seconds in which each server in a SQL Server cluster “checks” to see which other servers are actively participating in the cluster. *Default: 15 seconds.*

Sick seconds: When a resource group is moved (i.e., fails over when a server fails or automatically rebalances when a new server is added), AppCluster attempts to attach all the databases within the resource group to another server participating in the SQL Server cluster. If the databases (either all databases or the number of databases calculated based on the % of failed resources allowed parameter) are unable to attach to the server, AppCluster will attempt to attach them to another server in the cluster. This process will continue until all attempts to attach the databases to a server have been exhausted, at which point, AppCluster will place the resource group in a "sick" pool for the number of seconds specified in this parameter. Once the Sick seconds period expires, AppCluster will resume attempts to attach the databases to a server in the cluster. *Default: 120 seconds.*

Attach time out seconds: If the databases (either all databases or the number of databases calculated based on the % of failed resources allowed parameter) within a resource group are unable to attach to a server within the number of seconds specified in this parameter, AppCluster will detach any attached databases from the server and attempt to attach the databases to another server participating in the SQL Server cluster. *Default: 10 seconds.*

Send gratuitous ARP requests: When a SQL Server fails, the database (or databases) it was managing will be automatically moved to one (or more) active servers participating in the SQL Server cluster. To allow SQL Clients to more quickly regain connectivity to databases that have been migrated to another server, check the box "Send gratuitous ARP requests" to enable the sending of gratuitous ARP requests during database migration. *Default: Disabled.*

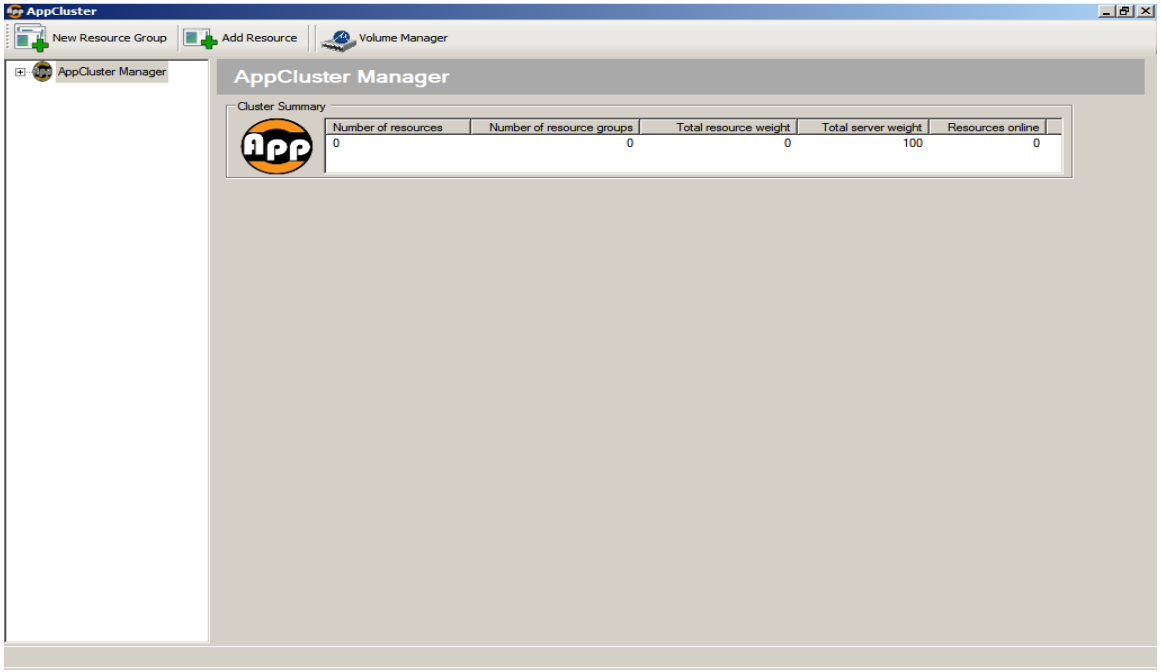
Click "OK" to apply and save any changes made to the Cluster Properties.

AppCluster can now be used to create and manage SQL Server clusters.

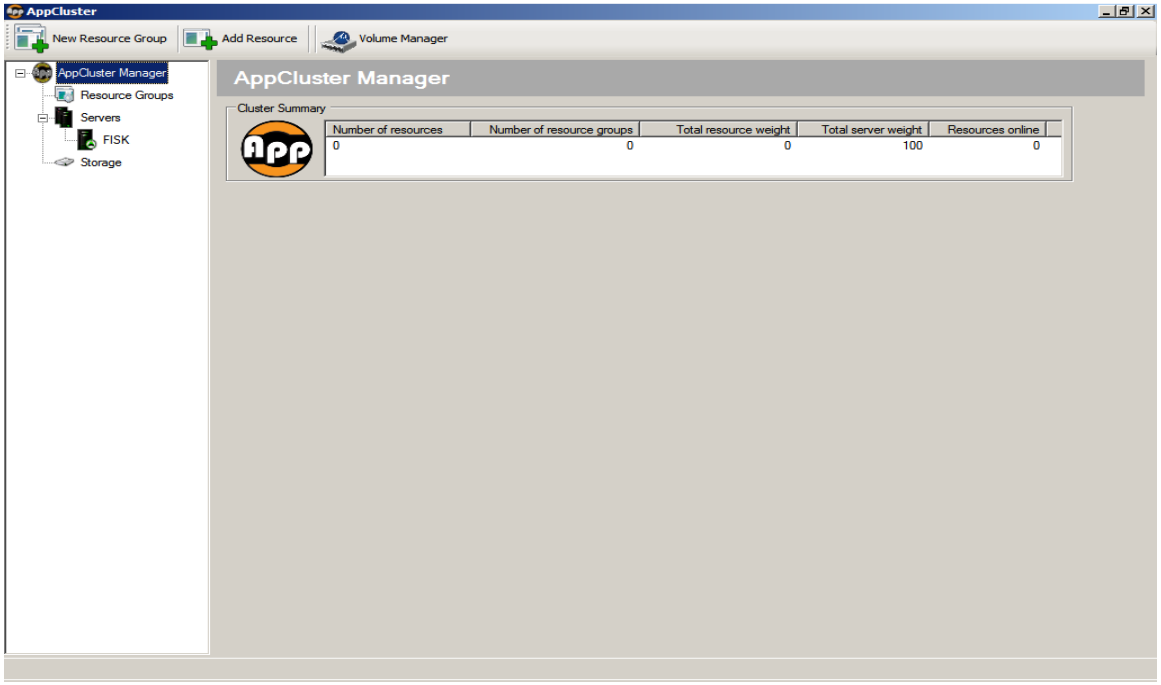
Note: *The initial configuration (first run) of AppCluster can be redone at any time by opening a command prompt, browsing to the installation directory of AppCluster (C:\Program Files\Sanbolic\AppCluster – default) and entering the following command:* ***appclusterui /firstrun***

Creating a SQL Server cluster

In the AppCluster management console, click the + sign on the left-hand side to open the AppCluster Manager tree.



The **Resource Groups**, **Servers** and **Storage** branches will be displayed in the AppCluster Manager tree:



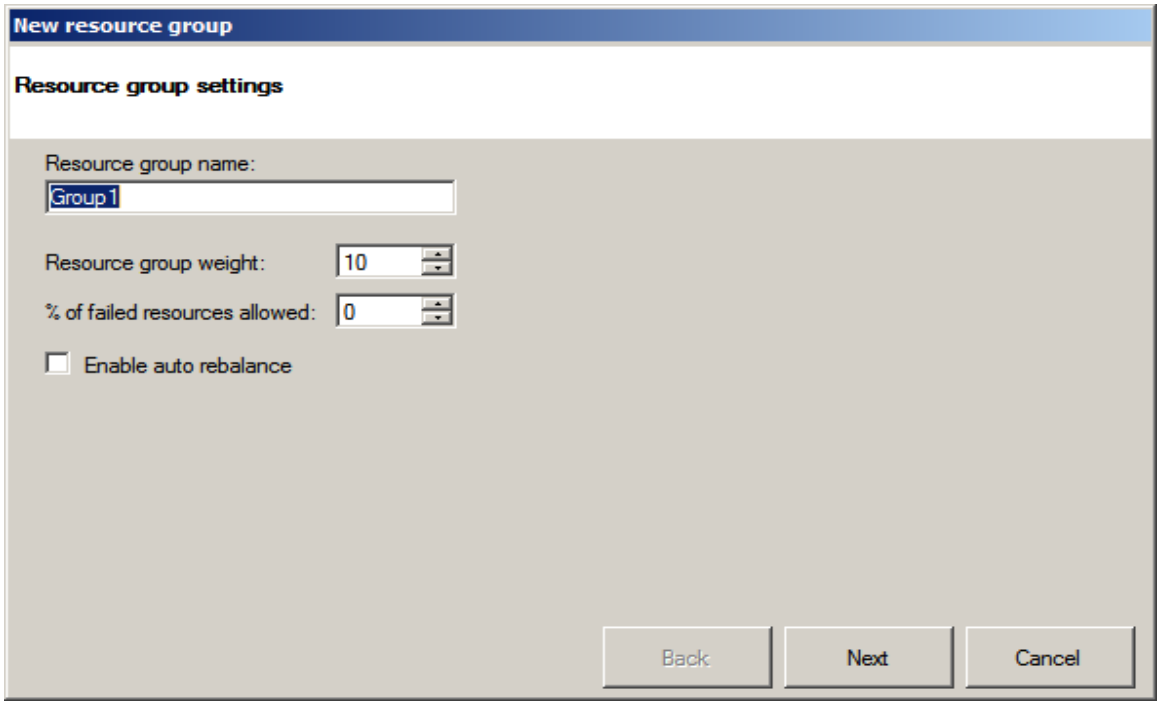
Creating a new Resource Group

To create a new Resource Group, click **New Resource Group** in the toolbar at the top of the AppCluster management console.

In the **Resource Group settings** configuration window, enter the Resource Group name, weight and % of failed resources allowed (prior to invoking Resource Group failover), and select whether to enable or disable (default) the Auto Rebalance feature.

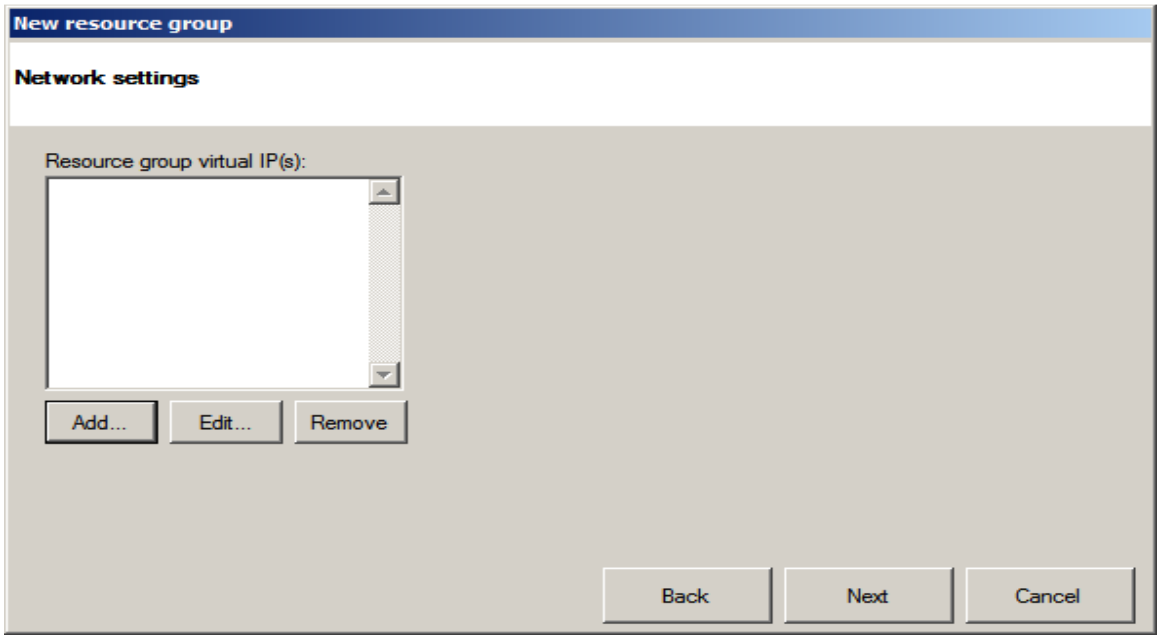
% of failed resources allowed: This parameter defines how many databases within a Resource Group can fail before the entire Resource Group (all databases within the Resource Group) fails over (is moved) to another server. For example, in a Resource Group containing 50 databases, if this parameter is set to 10%, AppCluster will not attempt to fail over (move) the entire Resource Group (all 50 databases) until a minimum of six ([.10 x 50] + 1) databases fail. This parameter is disabled by default.

Auto Rebalance: When this feature is enabled and another server is added to a SQL Server cluster, AppCluster will automatically attempt to rebalance (load-balance) Resource Groups (all databases within each Resource Group) across all servers participating in the SQL Server cluster. When this occurs, all connections to the databases from SQL Clients will be dropped. Once the databases have been moved, SQL Client connections will be re-established (automatically).



Click “Next” to continue.

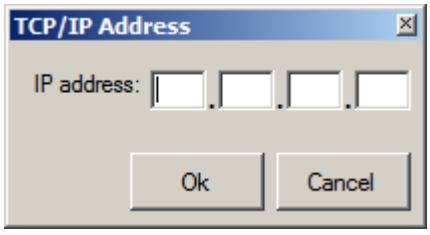
In the **Network settings** configuration window, click “Add” and enter the (virtual) IP address for the Resource Group.



Note: *AppCluster uses a virtual IP address to ensure seamless migration of databases between SQL Servers in the event of a server failure. By using an IP address rather than a server name, which is specific to any one machine, SQL Clients can continue accessing a database after it is moved to another SQL Server (when the server initially managing the database fails) using the virtual IP address assigned to the Resource Group. In order for this seamless migration to occur, SQL DB Administrators* ***must*** *include the virtual IP address entered in the* ***Network settings*** *configuration window in the SQL connection string for all SQL Clients accessing the database.*

SQL connection string syntax: virtual IP address + Instance_name + Database_name

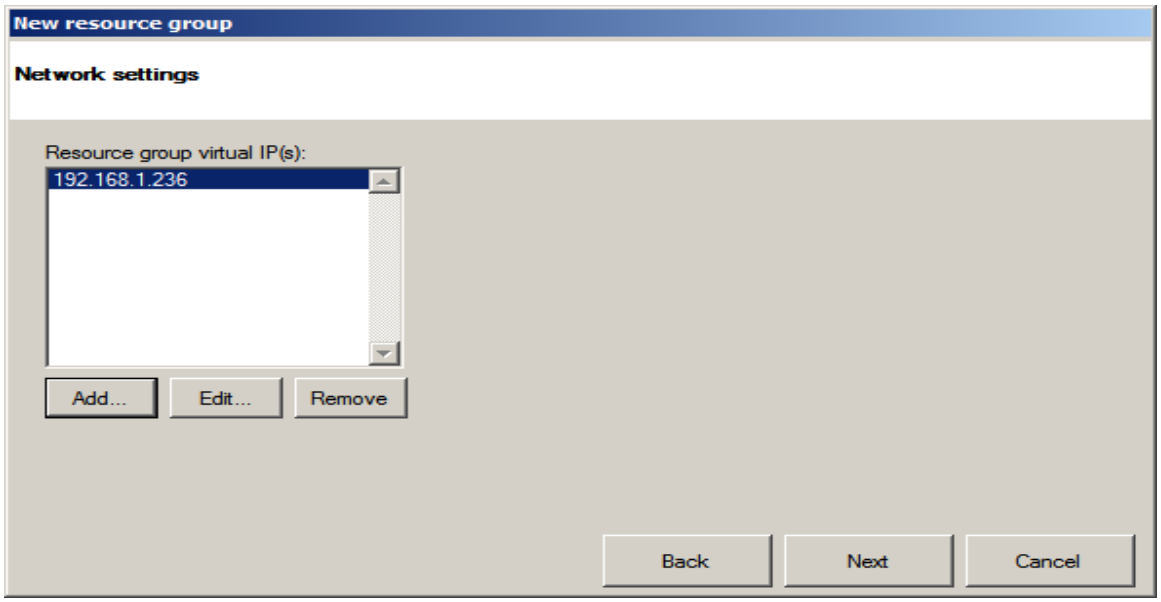
SQL connection string example: 192.168.0.100 + MSSQLSERVER + TestDB



Enter the virtual IP address for the Resource Group and click “OK”.

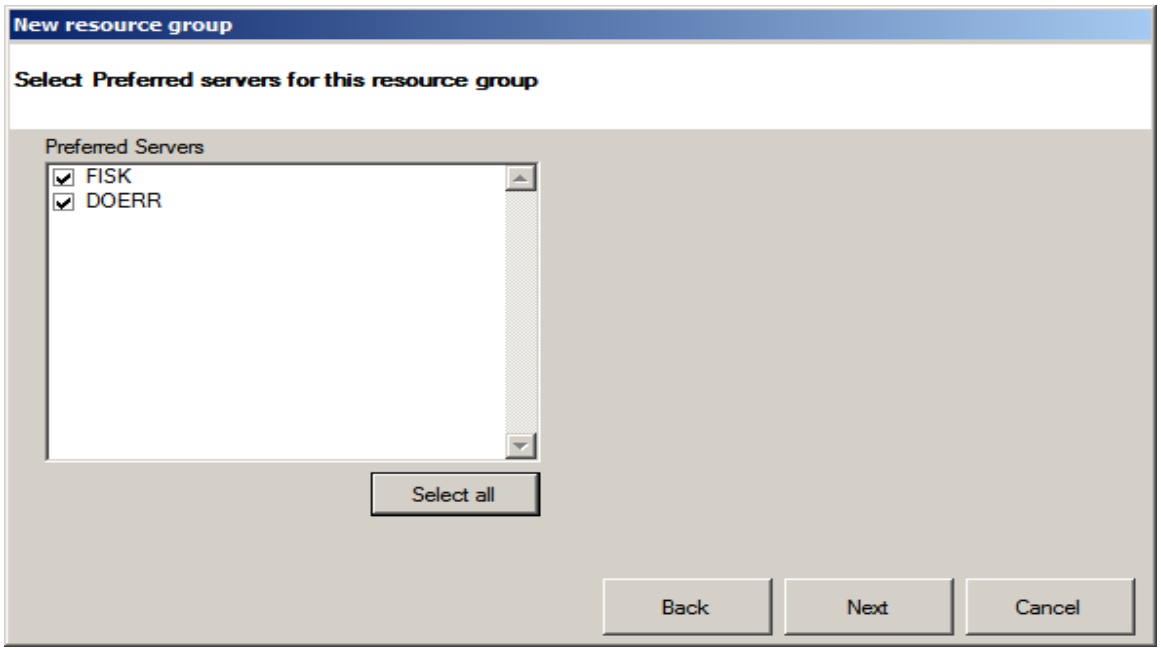
Note: *The virtual IP address should* ***not*** *be on the same subnet as the subnet used by Melio for cluster administration traffic.*

Note: *Multiple virtual IP addresses can be configured for a Resource Group.*



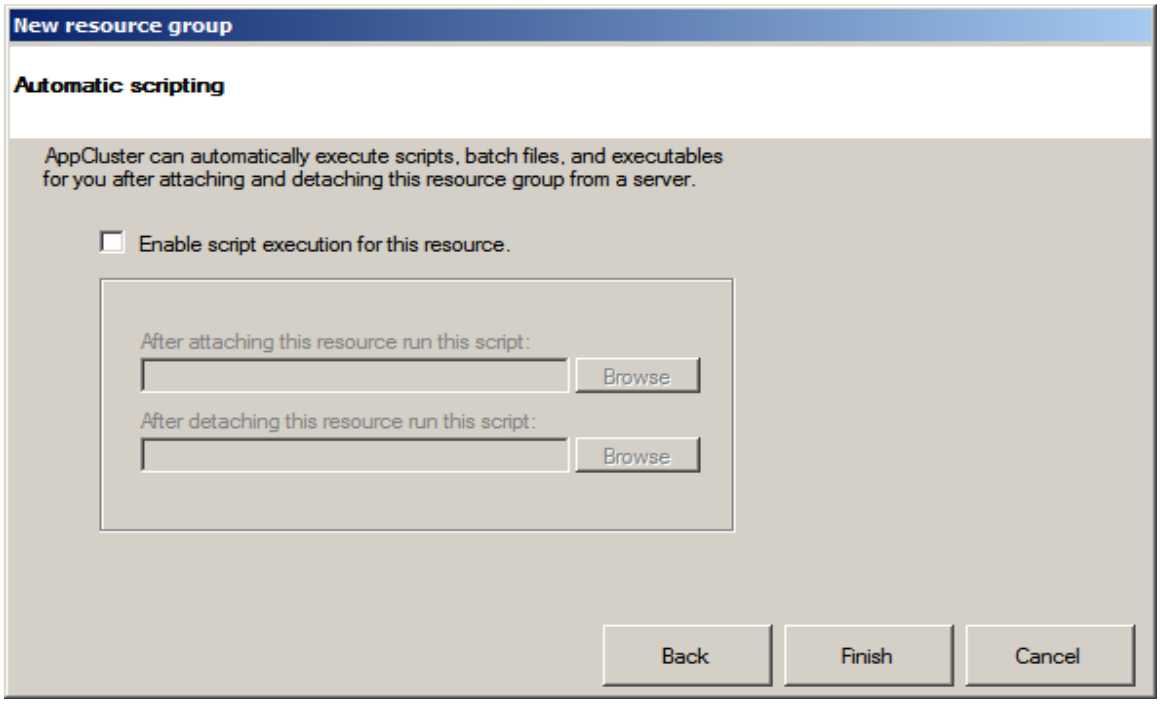
Click “Next” to continue.

In the **Preferred Servers** configuration window, select the SQL Servers that will be participating in the Resource Group. To select all servers, click “Select all”. These servers will share the virtual IP address configured in the **Network settings** configuration window. If one of the servers fails, the database(s) it was managing can be moved to any other server included in the Preferred Servers list for the Resource Group.

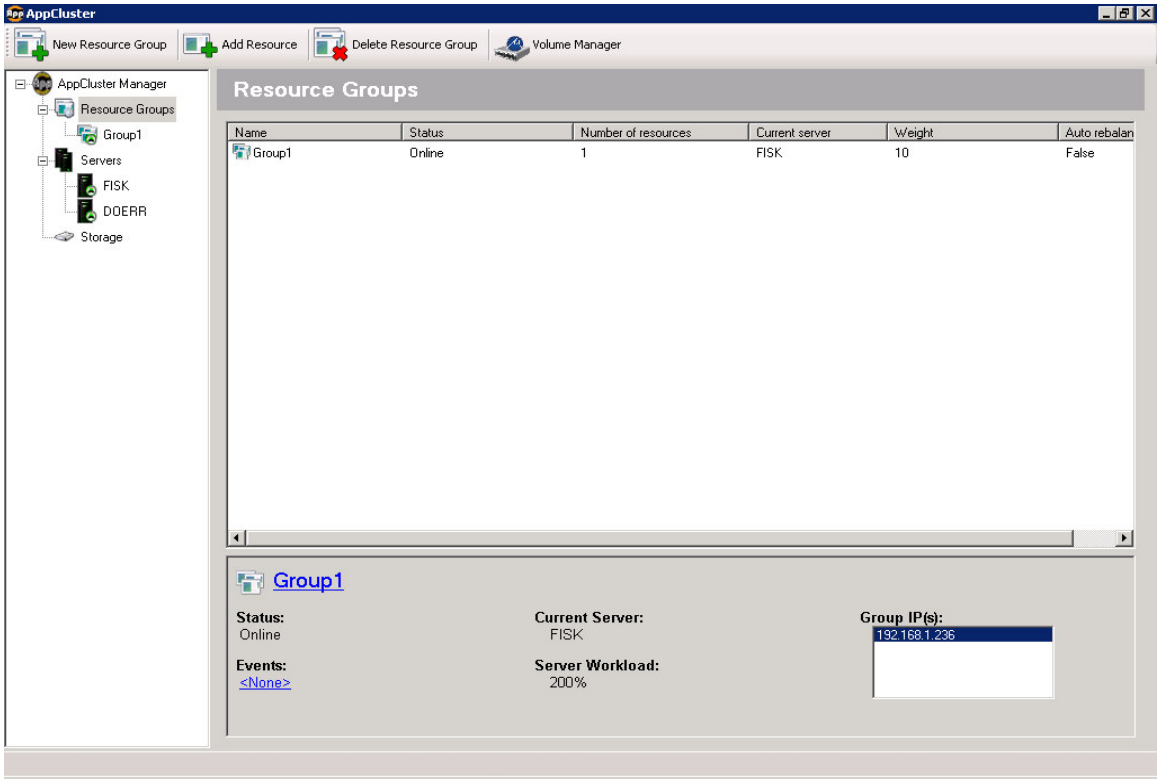


Click “Next” to continue.

In the **Automatic scripting** configuration window, check the box “Enable script execution for this resource” and then click “Browse” to select which scripts should be run after attaching and/or after detaching the Resource Group from a server. This setting is optional.


New resource group
Automatic scripting
AppCluster can automatically execute scripts, batch files, and executables for you after attaching and detaching this resource group from a server.
Enable script execution for this resource.
After attaching this resource run this script:
Browse
After detaching this resource run this script:
Browse
Back
Finish
Cancel

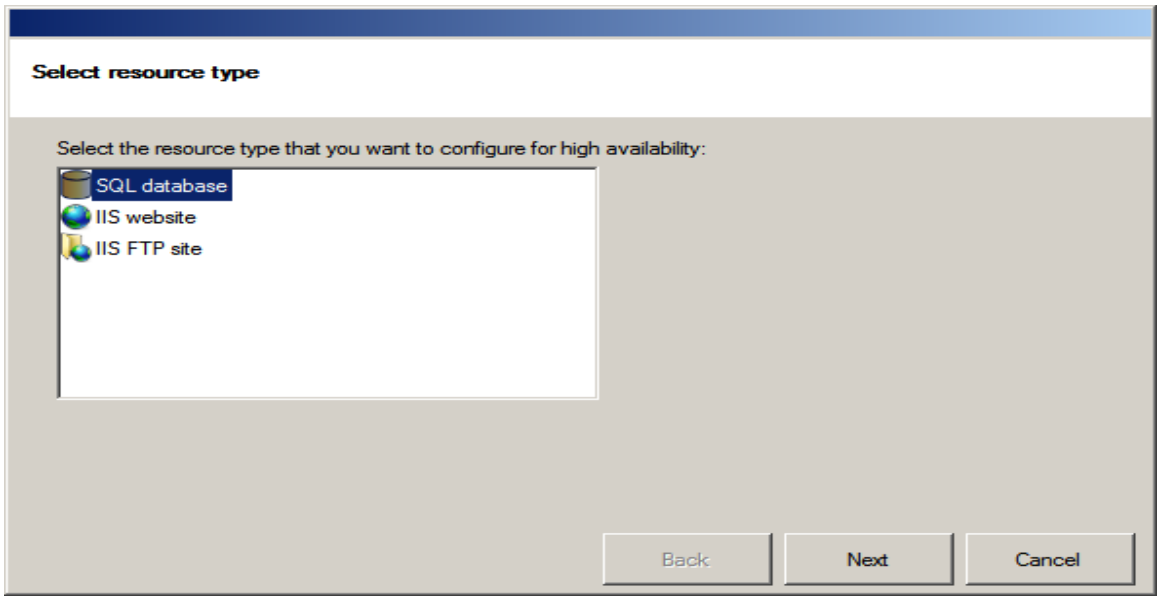
Click “Finish” to complete the configuration of the new Resource Group.



Adding a Resource

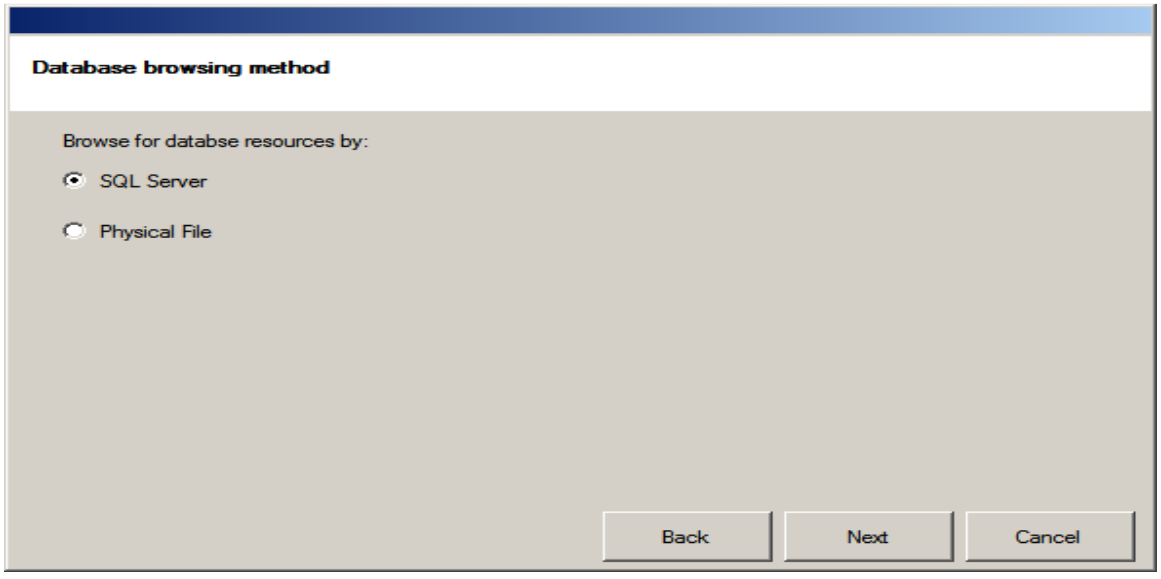
To add a new Resource, click **Add Resource** in the toolbar at the top of the AppCluster management console.

In the **Select Resource Type** configuration window, select “SQL database”.



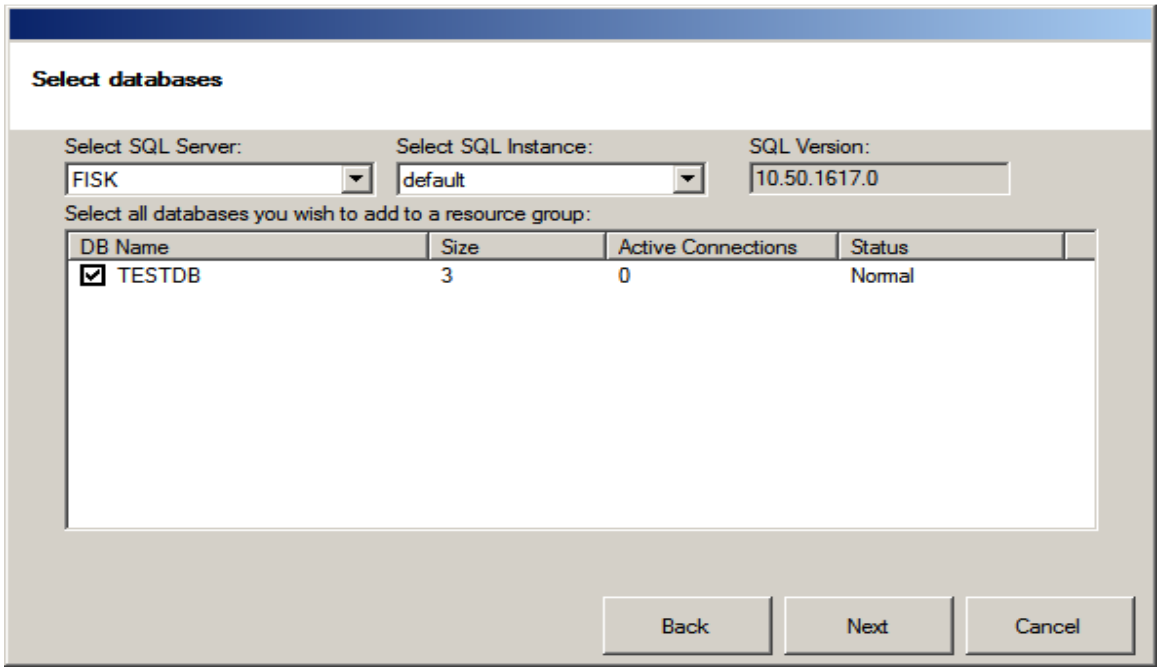
Click “Next” to continue.

In the **Database browsing method** configuration window, select “SQL Server”.



Click “Next” to continue.

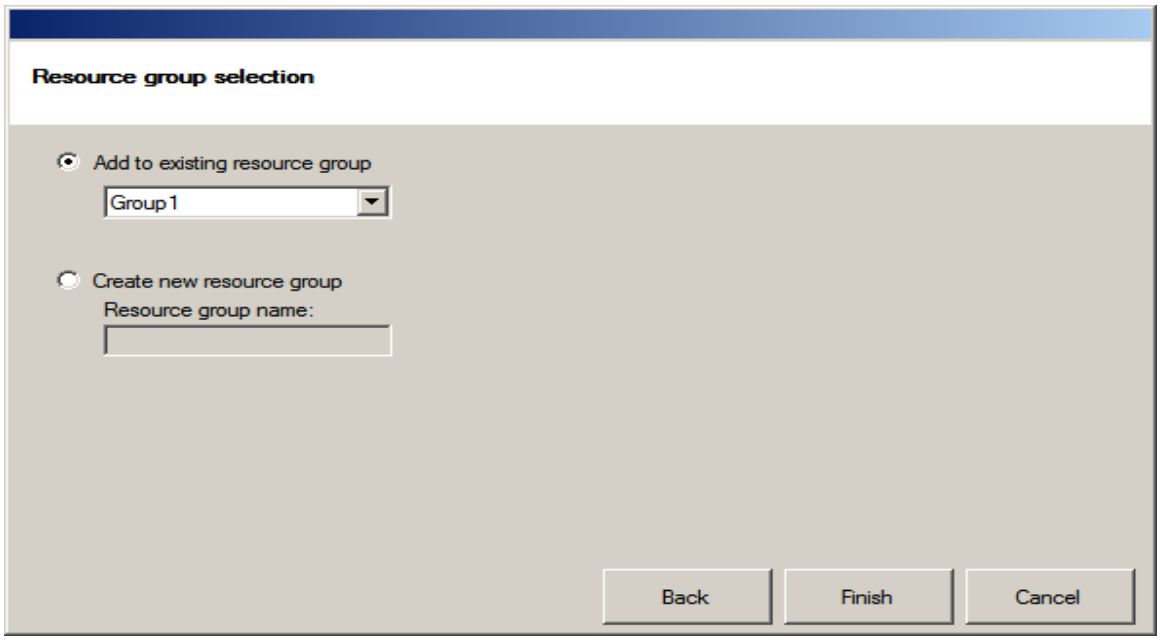
In the **Select databases** configuration window, use the drop-down menus to select the SQL Server and SQL Instance to browse.



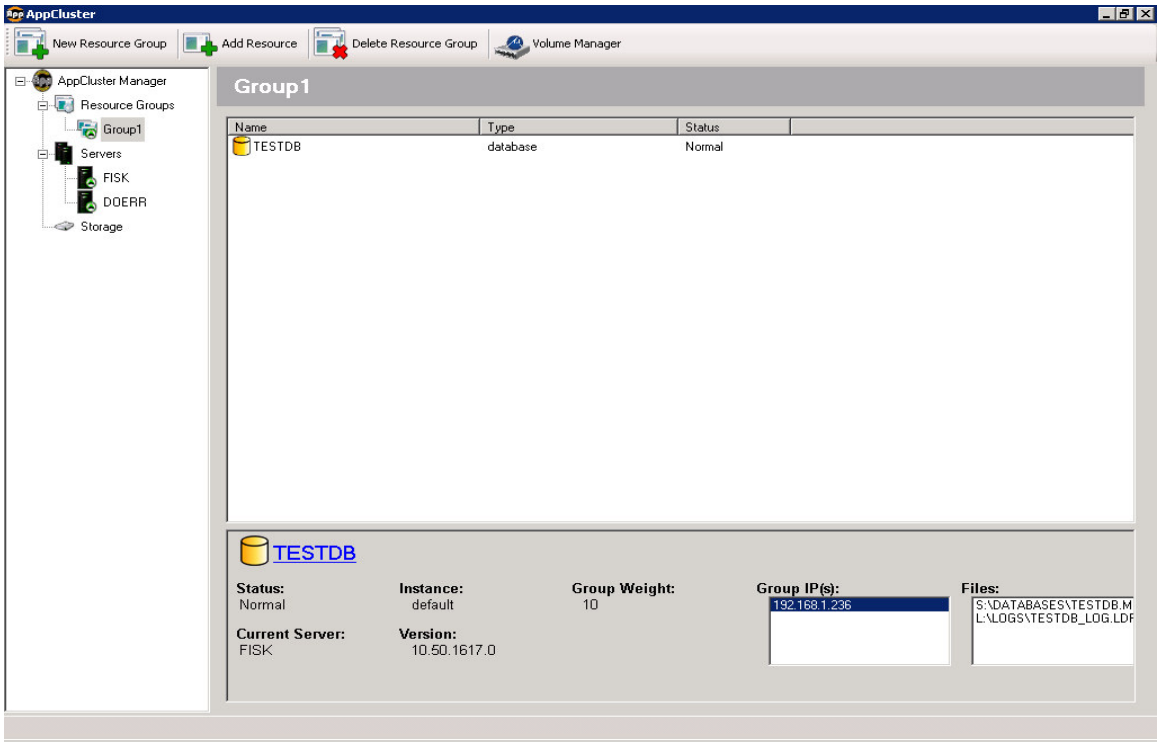
Select the database(s) that you want to make highly available.

Click “Next” to continue.

In the **Resource Group selection** configuration window, select “Add to existing resource group” and use the drop-down menu to select the Resource Group in which to add the resource.



Click “Finish” to complete the addition of the new resource.

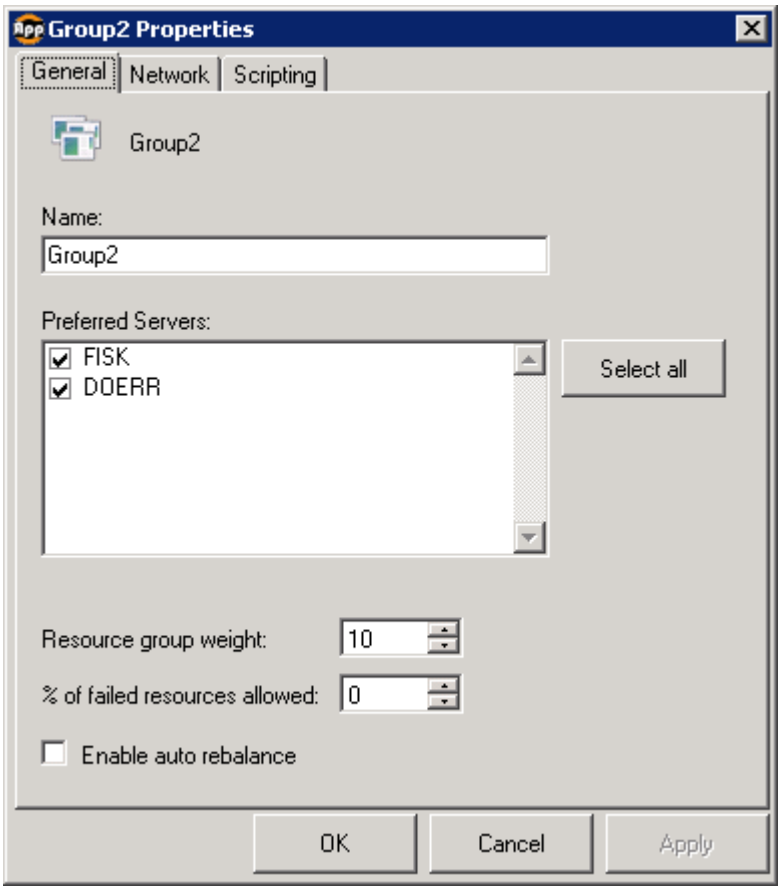


Modifying Resource Group Properties

The properties of a Resource Group, including group name, Preferred Servers, group weight, % of failed resources allowed, auto rebalance, virtual IP address(es) and scripting can be modified at any time.

To view or edit the properties of a Resource Group, right-click on the Resource Group under **Resource Groups** in the AppCluster Manager tree and select “Properties”.

The **Resource Group Properties** configuration window will be displayed:



After making any changes, click “Apply” to apply and save the changes to the Resource Group.

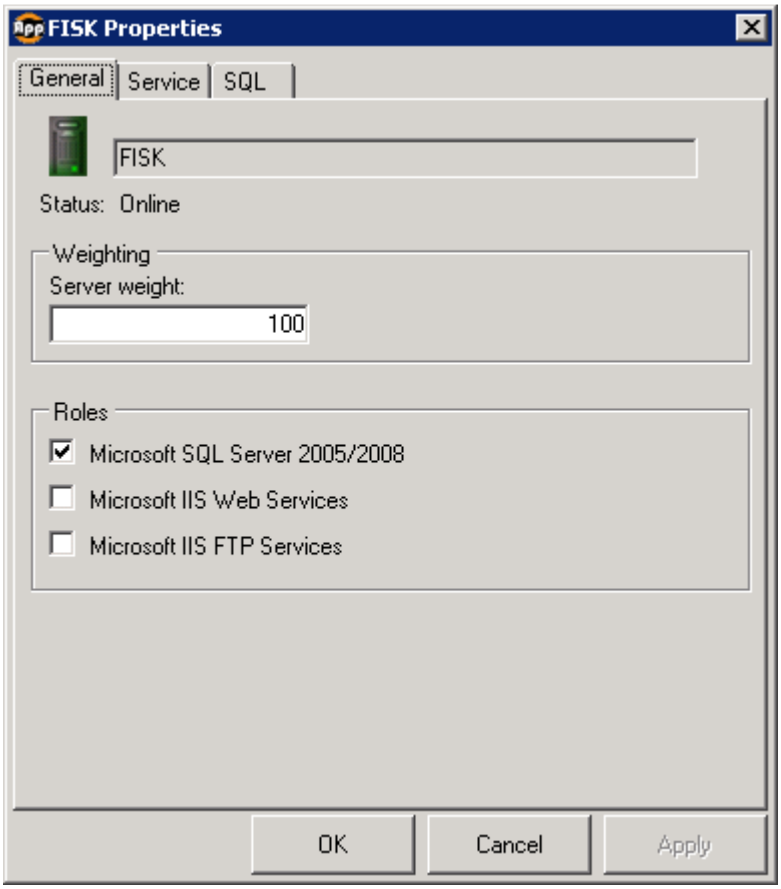
Click “OK” to close the **Resource Group Properties** configuration window.

Modifying Server Properties

The properties of a server, including server weight, role, service type and SQL Instance can be modified at any time.

To view or edit the properties of a server, right-click on the server under **Servers** in the AppCluster Manager tree and select “Properties”.

The **Server Properties** configuration window will be displayed:



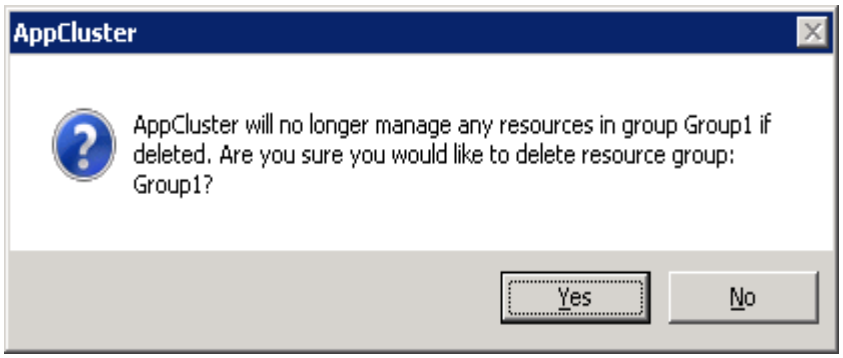
After making any changes, click “Apply” to apply and save the changes to the server.

Click “OK” to close the **Server Properties** configuration window.

Deleting a Resource Group

To delete a Resource Group, click **Delete Resource Group** in the toolbar at the top of the AppCluster management console.

Click “Yes” to delete the Resource Group specified in the Resource Group confirmation window.


AppCluster
AppCluster will no longer manage any resources in group Group1 if deleted. Are you sure you would like to delete resource group: Group1?
Yes
No

Contacting Sanbolic

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